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Nursing Care of 10 Patients with Vasovagal Reflex Caused by Artificial Liver Support System Treatment

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Abstract

This study outlines the essential nursing strategies employed in the care of 10 patients experiencing vascular vagal reflex, managed with artificial liver support systems. It highlights a holistic nursing approach tailored to the distinct clinical manifestations of these patients. Key interventions included early detection of psychological issues prior to initiating treatment, the implementation of comprehensive health education, meticulous monitoring of vital signs throughout the therapy, prompt emergency interventions when needed, adherence to prescribed medication protocols, and careful post-treatment observations including venous catheter management. Following rigorous treatment and dedicated nursing care, 7 patients demonstrated significant improvement and were subsequently discharged.

Keywords

Vasovagal Reflex, Artificial Liver Support System, Nursing Care

1. Introduction

The Vasovagal Reflex (VVR), also referred to as vasovagal syncope, occurs due to excitation of the vagus nerve by various chemical or physical stimuli, resulting in responses from the organs it regulates [1]. Typical clinical signs include a sudden decrease in heart rate, blood pressure fall, chest discomfort, nausea, vomiting, and in more severe instances, arrhythmias, fainting, seizures, and potentially cardiac arrest. The vasovagal reflex often arises from a mix of psychological and physiological factors [2]. Treatment with an Artificial Liver Support System (ALSS) removes toxins from the body, compensates for liver functions, and enhances the internal milieu, which in turn supports liver function recovery and

hepatocyte regeneration [3]. As a treatment grounded in blood purification, it has emerged as a critical and frequent intervention for conditions like moderate hepatitis, liver failure, among others [4]. The occurrence of vasovagal reflex is notably prevalent during cardiovascular interventional procedures and subsequent sheath removal, though reports of it resulting from ALSS treatments are rare. Between December 2018 and January 2021, our team managed 10 patients who developed vasovagal reflex following ALSS treatment. Through diligent care and treatment, 7 of these patients showed significant improvement and were subsequently discharged. Herein, we share our nursing insights and experiences from these cases.

2. Clinical Data

This cohort involved 10 instances of vagus nerve stimulation, consisting of 8 men and 2 women, with ages ranging from 16 to 85 years and an average age of 50.6 years. The duration of hospital stays varied from 10 to 66 days, with an average stay of 40.73 days. The group presented with different degrees of vasovagal reflex symptoms, including bradycardia in 5 patients, hypotension in 8, chest discomfort in 3, and syncope in 1. Diagnoses upon admission included liver failure in 4 patients, drug-induced liver damage in 1, cirrhosis in 2, and acute jaundice hepatitis in 3, all qualifying for artificial liver support system (ALSS) treatment. Treatments involved were 5 cases of straightforward plasma exchange, 3 of selective plasma component adsorption, and 2 combining both methods, utilizing the Asahi Kasei IQ-21 and Jianfan devices. Follow-ups via phone or outpatient visits a year post-treatment showed 7 cases improved significantly and were discharged, 2 self-discharged, and 1 death occurred due to co-existing diseases.

3. Comprehensive Nursing Interventions

3.1. Pre-Treatment Preparation

3.1.1. Psychological Support

The majority of patients undergoing ALSS treatment are in critical condition, leading to prolonged illnesses that many patients and their families are unfamiliar with, creating potential for anxiety, tension, or fear [5]. Research indicates that excessive concern can heighten psychological stress, disrupt sleep, increase sympathetic nervous system activity, trigger excessive catecholamine release leading to vasoconstriction and enhanced myocardial contractility, and stimulate the vagal activity via left ventricular and carotid artery sensors [6], which are primary triggers for stress-induced vasovagal reflexes. Consequently, nurses must assess patients' psychological readiness for ALSS treatment and provide tailored psychological support, clearly explaining the treatment's necessity, methodology, and procedure in accessible language to both patients and their families, addressing their concerns to help them psychologically embrace the treatment. Facilitating patient interaction with peers who have undergone similar

treatments can significantly alleviate anxiety and depression, enhance understanding and reduce fear and anxiety regarding the treatment, thereby boosting their confidence to combat the illness [7].

3.1.2. Systematic Patient Education

Building upon routine preparations for treatment, this involves instructing patients on how to urinate and defecate in a lying position, advising them to bathe the day before treatment, change into clean undergarments, and ensure skin hygiene. Skin preparation at the catheter site, briefing on the possible effects on daily life during catheterization, and practicing the positioning of limbs and key points for turning post-operation are essential steps. Patients should be advised to empty their bowels and bladder to minimize unnecessary movement. For critically ill patients, especially those with impaired consciousness, it's advisable to insert a urinary catheter for drainage. Dietary guidance should also be provided, recommending a diet rich in calories and vitamins but low in fat prior to treatment [8].

3.2. Care during Treatment

3.2.1. Catheterization Care

Ensuring a successful vascular pathway is crucial for ALSS. Femoral vein catheterization, preferred over peripheral venous catheterization due to its simplicity, longer duration of stay, lesser pain from repeated punctures, and reduced endothelial damage [9], due to the difficulty of subclavian venipuncture, the high incidence of thrombosis and stenosis, it is rarely used in artificial liver treatment, is frequently used in ALSS [10]. Catheterization should be carried out by specialized physicians, with the patient positioned as instructed to facilitate strict aseptic procedure. Close monitoring of vital signs during puncture and engaging with the patient to divert their attention can help lessen pain and anxiety. Post-catheterization, patients should be kept at rest, with vigilant monitoring for any signs of bleeding, redness, bruising at the puncture site, and assessing the temperature and pulse of the limb on the catheterized side.

3.2.2. Immediate Management of Symptoms and Vigilant Monitoring of Patient's Condition

Continuous cardiac monitoring is implemented, with vital parameters such as blood pressure, heart rate, and breathing assessed every 5 - 10 minutes, alongside evaluations of the patient's alertness, facial color, and the temperature of their extremities. Should a patient display pronounced decreases in blood pressure and heart rate, chest discomfort, or symptoms indicative of a Vasovagal Reflex (VVR), nurses are to initiate prompt emergency interventions. These actions encompass immediately alerting the physician, ensuring the patient lies down with their head turned to one side to prevent inhalation of foreign materials, administering continuous medium-flow oxygen to ease chest discomfort; reducing the speed of the blood pump and plasma output with a significant fall in blood pressure, extending the duration of plasma exchange as needed, and, when

required, following physician instructions to administer albumin [11].

3.2.3. Compliance with Medication Orders and Monitoring Drug Effects

Atropine stands as the preferred medication for addressing the vascular vagal reflex [12]. For serious VVR symptoms like arrhythmias or syncope, atropine sulfate 1 mg is administered intramuscularly immediately upon doctor's orders. In instances of noticeable blood pressure drops, dopamine is injected intravenously, coupled with a swift infusion of saline or a balanced fluid solution; if there's no significant improvement in blood pressure, the continuous intravenous infusion of saline and dopamine is maintained until the patient's blood pressure is stable; for patients experiencing vomiting, metoclopramide 10 mg is given intramuscularly as per physician's direction [13].

3.3. Care Following Treatment

3.3.1. Monitoring Patient Condition

Patients are advised to rest for 30 minutes post-treatment. Assuming no adverse changes in their condition, they may then be transferred back to their ward, ensuring a detailed handoff. It's critical to closely monitor blood pressure, heart rate, body temperature, and urine output. Nurses should continuously engage with the patient to assess their sensory feedback, meticulously examine the site of puncture, and evaluate the pulsation of the radial and dorsal pedal arteries [14]. 24 h after surgery, blood was collected to check liver function, kidney function, blood routine, electrolyte, coagulation routine, etc., and the observation and visit table of artificial liver patients was completed. Immediate medical consultation is required if there are any indications of a vasovagal reflex, such as a drop in blood pressure or heart rate, or chest tightness.

3.3.2. Nutritional Advice

The liver function and gastrointestinal swelling of patients post-artificial liver therapy are not fully restored. Overeating, particularly excessive protein intake, may trigger complications like increased blood ammonia levels, hepatic encephalopathy, or gastrointestinal hemorrhage. Hence, it's vital to communicate to patients the critical nature of dietary management within the first 72 hours after surgery, with a particular emphasis on restricting protein consumption to less than 0.5 g/d [15]. Recommendations include smaller, more frequent meals consisting of nutrient-dense, bland, and easily digestible liquids or semi-liquids. If required, nutrition should be supplied through non-oral routes.

3.3.3. Venous Catheter Management

Post artificial liver therapy, the catheter should be secured with a sterile heparin lock cap to ensure proper fixation and patency, thus preventing leakage and accidental removal. It's vital to monitor for bleeding, hematoma, or discharge, and perform daily dressing changes and catheter stabilization. The patient should remain in a flat position to avoid lying on the catheter side, which could bend the catheter. Daily flushing with heparin solution is essential to maintain cathe-

ter openness [16]. The catheter may also be utilized for infusions when necessary, under strict sterile conditions. Before any infusion or blood transfusion, withdrawing 3 - 5 ml of blood to check for clots, followed by a 3 - 5 ml saline flush, is critical to ensure safety. Before catheter removal, evaluate the patient for any signs of slowed heartbeat, low blood pressure, paleness, or nausea. The removal should be gentle, followed by standard disinfection and pressure application on the puncture site with sterile gauze for 5 - 10 minutes to avoid bleeding or air embolism, advising the patient to rest and avoid strenuous activities that could lead to bleeding.

4. Conclusion

ALSS plays a pivotal role in treating severe hepatitis and liver failure, showing clear therapeutic benefits and marked improvements. The occurrence of VVRs during therapy, if not quickly identified and addressed, can swiftly worsen, having grave outcomes. This research highlights that by grasping the causative aspects and clinical presentations of VVRs, early detection, accurate assessment, immediate medical notification, and implementing specific therapeutic and nursing interventions, including pre-treatment psychological support and education, meticulous condition monitoring, timely emergency management, adherence to prescribed medications, and careful post-treatment care, notably diminishes the risk of VVRs. Enhancing the safety and effectiveness of ALSS treatments not only improves care quality and efficiency but also merits wider clinical adoption and implementation.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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